

# Evaluating the IPS

W. Traub

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# Cramer-Rao Bound (Fischer Matrix Analysis)

- The zero-noise image flux is  $F(x,y,t,a_1,a_2,...a_n)$  (elec.)
- The noise is  $\sigma(x,y,t,a_1,a_2,...a_n)$  (elec.)
- Calculate partial derivatives  $f_i = dB/da_i$
- Calculate matrix elements  $b_{ij} = \sum_{xyt} f_i * f_j / \sigma^2$   
summing over all values of  $x,y,t$ .
- Calculate inverse matrix  $c = b^{-1}$
- Then uncertainty in each parameter is  $\sigma_i = (c_{ii})^{1/2}$
- Compare this  $\sigma_i$  with the actual scatter from fitting the time series of data; expect comparable values.

# Comparison with Simulations

- Actual uncertainties will be equal to or greater than the Cramer-Rao bounds.
- Experience with SIM-RV shows nearly equal.
- Value of simulation is
  - (a) demonstration of ability to extract parameters from simulated data, &
  - (b) demonstration that mission can henceforth be modeled using the CR formalism, &
  - (c) demonstration to world that we are serious.